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AUTHOR Reynolds, Maynard C.; And Others
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ABSTRACT

This study of the knowledge bases of education began with a "meta-review" of the research literature in special and regular education and identification of specific learning variables. The effort focused on determining the extent that special and regular educators work from common bases of knowledge and the degree of appropriate merging during teacher preparation. Results of the literature review were summarized in the form of a 228-item survey questionnaire. A Delphi survey of a 12-member panel of experts was followed by a broader set of surveys of 8 groups of educators: special education classroom teachers (N=449), regular teachers (N=182), school psychologists (N=207), principals (N=92), state and territorial directors of special education (N=37), directors of Chapter 1 programs (N=41), special education researchers (N=55), and authors of major research reports and reviews (N=61). The study found a high degree of consensus about variables considered important for creating learning environments, especially among regular education and special education teachers. Results support increased broad collaboration between regular and special education. Tables list the 20 most highly rated variables, additional instructional variables rated as important, and specific results from each group surveyed. (DB)

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VARIABLES IMPORTANT TO LEARNING: A KNOWLEDGE BASE FOR SPECIAL AND REGULAR EDUCATION

by

Maynard C. Reynolds
University of Minnesota

Margaret C. Wang
Temple University Center for Research in Human Development and Education

and

Herbert J. Walberg
University of Illinois at Chicago

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INTRODUCTION

Clearly a restructuring of the place of special education within the schools is occurring. A major feature of the process has been described as progressive inclusion (Reynolds & Birch, 1988); that is, the gradual increase in the numbers and proportions of handicapped children who receive their special education while enrolled in regular classes and schools. Some educators believe the progress is too slow and the inclusiveness too limited (Gartner & Lipsky, 1987; Stainback, Stainback, & Forest, 1989) while others see it as too rapid and based on arguable assumptions (Kauffman, Gerber, & Semmel, 1988; Vergason & Anderegg, 1989). But everyone appears to agree that to the extent that high quality integrated special education is to be achieved there must be strong teamwork by educators of all kinds.

This report discusses findings from a study of the knowledge bases for both regular and special education. Among the questions addressed in the study were: What are the conditions that enhance the learning of children? and To what extent are such conditions judged to be different by teachers of handicapped and of nonhandicapped children and by other educators? In a research review reported in 1986, Brophy concluded that students from disadvantaged backgrounds and many special education students need more instruction than others but not a different kind of instruction. If that finding is sustained, the implications for special and regular teacher preparation and for program structure are important.

The study looks broadly at the research literature in order to specify the well-confirmed knowledge about school learning and then asks various groups of specialists to make judgments about the importance of the identified variables or principles in their work. The idea is to ascertain whether we have one or several distinct knowledge bases to be considered as progressive inclusion proceeds. To the extent that special and regular educators work from common bases of knowledge, there is added reason to press toward merger, at least in teacher preparation, rather than for separation.

It is important to note that the study focused on alterable variables; that is, conditions that educators have some chance of changing in ways that enhance learning. Not considered were variables such as chronological age and socio-economic status which are static or relatively so and largely impervious to the influence of teachers. Literature in highly distinct fields, such as education for students who are blind or deaf, treatment of major affective disorders, therapy for speech disorders, and education for severely and profoundly disabled students, was not covered thoroughly. Thus, findings will be applicable mainly to the milder degrees of disability. Furthermore, the study dealt only with declarative knowledge in a limited domain, concerned mainly with pedagogical principles. It did not include knowledge of subject matter to be taught (history, geography, mathematics, etc.); and it did not include consideration of legal and ethical principles. It considered what teachers should know, but not how they should learn it or when to use it.

THE LITERATURE REVIEW

The study began with a comprehensive "meta-review" and synthesis of research on variables relating to school learning. The review covered literature in both regular and special education, including, for example, the chapters in the review volume sponsored by the American Educational Research Association Handbook of Research on Teaching (Wittrock, 1986); the three-volume Handbook on Special Education: Research and Practice (Wang, Reynolds, & Walberg 1987, 1988, 1989); Designs for Compensatory Education (Williams, Richmond, & Mason, 1986); and the annual review series published in education, special education, psychology, and sociology. Considered, in total, were 86 chapters from annual review series, 44 handbook chapters, 20 government and commissioned reports, 18 book chapters, and 11 review articles in journals.

A total of 228 variables considered to be important to school learning were identified through the literature review. More than 10,000 separate statements about the strength of associations between the variables and student learning were tabulated, then reduced to 3,700 summary ratings. (For

a detailed summary of the findings from this research synthesis, see Wang, Haertel, & Walberg (1989)).[1] The 228 variables were then organized in the form of a questionnaire.

THE DELPHI SURVEY

The next step was to conduct a Delphi Survey, using the survey questionnaire with a 12-member national panel of researchers and leading practitioners.[2] The aim was to get the judgments of a representative group of leading experts about teaching and learning. They were asked to rate each item for importance in the learning of children and to add, delete, and suggest changes in items. A somewhat revised set of items was used in a second round of the Delphi Survey and in a broader set of surveys with other groups. Tables 1 and 2 show examples of the variables included in the survey.

Table 1 lists the 20 variables that were rated as highly important by the 12-member panel of experts. Each of the 20 items was rated "high" (on a scale of 1 to 3) by at least 10 of the 12 experts. It is of interest to note that there were no significant changes from round 1 to round 2 in the Delphi procedure. The 20 variables that were rated by experts as highly important are clustered under four of the six major categories included in a conceptual model drawn from extant findings on factors affecting student learning. The model (Wang, 1986) is grounded on the assumption that each learner brings to the school learning environment a unique profile of instructionally relevant student characteristics (e.g., level of use of learning strategies, reading comprehension ability, attitudes toward learning, level of general academic knowledge) that interact with features of the instructional program, the support system, and classroom management and climate. The conceptual framework included two other categories of variables -- degree of implementation of the instructional program and local demographics -- that produced no items in the "top 20," as rated by the panel of experts.

Table 2 lists an additional 20 variables, all of them falling under the instruction rubric, which the panel of experts rated as important (a mean rating of above 2.5), but which fell below "top 20" level. Taken together, the

40 variables listed in Tables 1 and 2 begin a specification of variables to be taken into account in teacher preparation and in arranging instruction for children. Whether various sub-groups of educators see the situation similarly is discussed in the following section.

THE BROADER SURVEY OF CONSENSUS FROM THE FIELD

To investigate questions about consensus among various educators on variables considered important, eight groups of professionals were formed and asked to respond to the survey (see Table 3). Through the cooperation of the Council for Exceptional Children (CEC) a random sample of 1001 teacher members of CEC was obtained; all are special educators. Surveys were sent to them; 449 (45%) responded. Each of the special education teachers was asked to recruit as an additional respondent the "regular" teacher whose classroom was nearest to his/her own classroom; 182 regular teachers responded. A sample of 526 school psychologists was selected randomly from the membership list of the National Association of School Psychologists; 207 (39%) responded. Each psychologist was asked to recruit a school principal in a building they served. Ninety-one school principals responded. All state and territorial directors of special education and of Chapter I programs were asked to complete the survey which they did at relatively high rates: 66% (N = 37) and 59% (N = 41), respectively. A group of special education researchers was created by assembling names of recipients of federal research grants in the field of special education relating to services for mildly handicapped students in regular education settings; 55 of 197 (28%) responded. A final category of education researchers/authors was created by assembling names of first authors of 134 major chapters in the various research reports and reviews used in the "meta-review" aspects of the study; 61 (46%) responded.

Table 4 reports the Pearson Product Moment correlation coefficients among mean ratings of the 228 items by the eight educator groups. It may be noted, for example, that the correlation of mean ratings by regular and special education teachers was .95. That was the highest correlation observed. All correlations tended to be high, the median among 28 correlations being .88. The lowest correlation (.77) was between State Directors of Special Education

and Education Researcher/Authors. Considering the entire matrix of correlations, it seems fair to conclude that there is a very high degree of consensus among such educator groups as studied here about the variables that are important in attempts to enhance the learning of children in school. Judged by correlational analysis there is remarkable similarity in the views of special and regular teachers about principles to be considered in their teaching.

The responses of the eight educator groups and the panel of experts was further analyzed by comparing the "top 20" variables as rated by each group. Even though the correlations across groups were high, when all 228 variables in the survey were considered, the top-rated items were found to be somewhat different among groups.

Table 5 summarizes the responses of the panel of experts and the other eight groups using the same four categories included in the conceptual model (Wang, 1986) as used in framing Table 1. It is notable that the panel of experts, both categories of researchers, and state directors of special education put relatively high emphasis on variables relating to instruction. For special education researchers, 13 of their "top 20" items dealt directly with instruction. The comparable numbers were 10, 11, and 9 for the panel of experts, educational researchers/authors, and state directors of special education, respectively.

Special and regular education teachers rated a smaller number of variables relating to instruction as of highest importance. Instead, the teachers tended to put more emphasis on classroom management and climate variables than other groups did. Also, teachers tended to rate their own authority to make decisions as highly influential in learning. Researchers do not fully agree that variables reflecting authority for teachers in decisions about curriculum and instruction have been validated for importance in learning. Teachers also put high emphasis on characteristics of students, especially those relating to attitudes toward learning, as very important. State and local administrators tended to place more emphasis on support variables, such as family interest in education, than did teachers and researchers. All groups rated parent

ABSTRACT

The study began with a "meta-review" of the research literature in special and regular education. Results were summarized in the form of a 228-item survey questionnaire. A Delphi Survey of a panel of experts and other surveys of eight groups of educators followed. Results showed a very high degree of consensus about variables considered important for creating learning environments, especially among regular education and special education teachers.

attitudes, expectations, and involvement in school affairs as very important.

DISCUSSION

This study has identified variables shown by research and judged by practitioners to be of high importance in establishing school learning environments. It may be concluded that these are among the dimensions of knowledge and instructional practice which deserve high attention in the initial preparation and continuing education of teachers. There is remarkable similarity among special and regular education teachers in judgments about what variables or principles of instruction are important. This suggests that much can be done in common in colleges and universities in the preparation of special and regular education teachers.

The variables identified as important for learning in the present study also may be viewed as a basis for studying individual students. This idea has not been widely explored, but appears to be sensible. For example, it might be observed that time-on-task tends to be low in a particular class or school. Perhaps a great deal of time is being given to management functions or to transitions between activities, at the expense of time devoted to instruction. In such a situation, plans and remedies can be implemented to improve the use of time in the classroom. But it may be equally important to observe individual differences among students in use of time and to identify those for whom increasing time-on-task needs most improvement. Most of the variables revealed in the study can be used in this dual way; that is, to study both situations and individual differences.

The approach to improvement of education growing from this study calls attention mainly to alterable variables and to the "level of the lesson"; that is, to the practical realities of teaching rather than to remote dispositional analysis. By the latter term we refer to testing for IQs, hypothesizing about "underlying process deficits", or other procedures for specifying remote dispositional states that some believe form the foundational aspects of special education. We believe that approach is a mistake and that, at least in the present state of knowledge about teaching, it is preferable to base instruction

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on factors directly observable and manageable in the learning environment.

We believe that much of special education would profit from rigorous efforts for improvement organized around variables identified as important for learning. Too often what has been claimed to be special has been quite ordinary. Haynes and Jenkins (1986), for example, have shown that students who go to resource rooms part-time for instruction often end up with no more total time on-task in subjects intended to have extra attention (e.g., reading) than if they had stayed fulltime in regular classes. Allington and McGill-Franzen (1989) report a similar finding. They observed students (all of them failing in reading) for an entire school day and found that students in special education actually received not only fewer minutes of reading instruction but less active teaching time and a higher proportion of "seat work" than pupils in regular classes. Important work remains to be done to clear out procedures that lack validity and increase adherence to principles and practices that have demonstrated worth in instruction.

The review of research and related surveys reported here help to sketch out the knowledge base on which special education of the future might be constructed. Because of the high consensus among educators, both special and regular, on variables that are important in arranging learning environments, it appears that much of the work near term should involve increased broad collaboration rather than separations of the kinds so common in the past.

NOTES

1. For a copy of the complete bibliography of materials reviewed and details of text citations, write to Prof. Margaret Wang, Center for Research in Human Development and Education, 933 Ritter Annex, Temple University, Philadelphia, PA 19122.

2. The 12-member panel included: Jere Brophy, Katherine Butler, Donald Clark, Joyce Epstein, Barbara Keogh, Jeffrey Osowski, Daniel Reschly, Judy Smith-Davis, Tom Skrtic, Carolyn Trice, James Ysseldyke, and Martha Ziegler.

Table 1

Twenty Variables Most Highly Rated by 12-Member Panel of Experts as Important for the Learning of Children: Represented in Four Categories

Categories*	Variables
Instruction	Time on task (student time engaged actively in learning)
	Time spent in direct instruction on basic skills in reading
	Time spent in direct instruction on basic skills in mathematics
	Providing frequent feedback to students about their performance
	Comprehension monitoring by the teacher (planning; monitoring effectivenes of actions; testing, revising, and evaluating learning strategies)
	Explicitly promoting student self-responsibility and effective metacognitive learning strategies
	Use of clear, organized, direct instruction
	Setting and maintaining clear expectations of content mastery
	Teacher reacts appropriately to correct and incorrect answers
	Task difficulty is appropriate (students are appropriately challenged)
Support System	Parental expression of affection to children
	Parental interest in student's school work
	Parental expectation for academic success
Student Characteristics	Use of self-regulation, metacognitive strategies
	Level of reading comprehension ability
	Attitude toward school
	Attitude toward teachers
	Motivation for continued learning
	Level of general academic knowledge
Classroom Management and Climate	Safe, orderly school climate

*these categories were taken from the conceptual model of variables that are important to learning (Wang, 1986)

Table 2

Additional Instructional Variables Rated as Important and Well-Confirmed by Research by the 12-Member Panel of Experts

Prescribing individualized instruction based on perceived match of type of learning tasks to student characteristics.
Use of procedures requiring rehearsal and elaboration of new concepts.
Systematic sequencing of instructional events and activities.
Explicit reliance on individualized educational plans (IEP) in planning day-to-day instruction for individual students.
Use of instruction to surface and confront student misconceptions.
Use of advance organizers, overviews, and reviews of objectives to structure information.
Clear signaling of transitions as the lesson progresses.
Significant redundancy in presentation of content.
Teacher conveys enthusiasm about content.
Using reinforcement contingencies.
Corrective feedback in event of student error.
Promoting learning through student collaboration (e.g., peer tutoring, cooperative group work).
Flexible grouping that enables students to work to improve and change status/groups.
Teaching for meaningful understanding.
Degree to which student inquiry is fostered.
Scaffolding and gradual transfer of responsibility from teacher to student.
Degree to which assessment is linked with instruction.
Skills taught within the context of meaningful application.
Good examples and analogies to concretize the abstract and familiarize the strange.
Explicitly promoting student self-monitoring of comprehension.

Table 3

Response Groups and Response Rates:
Survey of Variables that Influence Learning

Groups	Number of Surveys Mailed	Number of Responses Rec'd.	Percent Rec'd.
Special Education Teachers	1001	449	45%
Regular Education Teachers	*	182	--
Principals	**	91	--
School Psychologists	526	207	39%
State Directors of Special Education	56	37	66%
State Directors of Chapter I Services	69	41	59%
Special Education Researchers	197	55	28%
Education Researchers/Authors	134	61	46%

*Distributed by respondents in the Special Education Teacher group

**Distributed by respondents in the School Psychologist group

Table 4

Pearson Correlations of Mean Ratings of 228 Variables by Eight Respondent Groups

Respondent Groups	ERA	SER	SPs	SPr	SDSE	SDCI	RET	SET
Educ. Researchers/Authors (ERA)	1.00							
Special Educ. Researchers (SER)	.91	1.00						
School Psychologists (SPs)	.88	.90	1.00					
School Principals (SPr)	.84	.86	.93	1.00				
St. Dirs. of Special Educ. (SDSE)	.77	.87	.89	.87	1.00			
St. Dirs. of Ch. I Programs (SDCI)	.81	.84	.92	.92	.88	1.00		
Regular Educ. Teachers (RET)	.80	.82	.92	.94	.82	.89	1.00	
Special Educ. Teachers (SET)	.78	.85	.95	.92	.88	.89	.95	1.00

Table 5

Twenty Most Important Variables that Were Rated as Highly Important by the Panel of Experts and Eight Professional Groups: Represented in Four Categories

Professional Groups	Categories of Variables*			
	Instruction	Support Systems	Student Characteristics	Classroom Management and Climate
12-Member Panel of Experts	10	3	6	1
Special Education Researchers	13	2	3	2
Educational Researchers/Authors	11	3	5	1
State Dirs. of Special Education	9	6	3	2
State Dirs. of Chapter I Programs	4	7	7	2
School Psychologists	3	5	8	4
School Principals	4	7	5	4
Special Education Teachers	4	3	8	5
Regular Education Teachers	2	4	6	8

*These categories were included in the model of variables that are important to learning

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State Dirs. of Chapter I Programs	4	7	7	2
School Psychologists	3	5	8	4
School Principals	4	7	5	4
Special Education Teachers	4	3	8	5
Regular Education Teachers	2	4	6	8

*These categories were included in the model of variables that are important to learning